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## SECTION 1 - INTRODUCTION

### 1.1     Purpose of Guideline

This supplement to the EPA EDI Implementation Guideline outlines the implementation of the Electronic Data Interchange (EDI) interface for submission of the Discharge Monitoring Report (DMR) to the U.S. EPA National Pollutant Discharge Elimination System (NPDES).

### 1.2     Scope and Applicability

The Implementation Guideline is intended to provide NPDES permittees with the information necessary to understand the EDI goals of EPA.  This document contains the specifics for conducting business with EPA using EDI for DMR submissions.  For copies of the DMR EDI  Implementation Guideline contact the EPA Public Information Center, U.S. EPA, Headquarters (3404), 401 M Street, S.W. Washington, D.C. 20460 - Phone: (202) 260-2080 or the Water Resource Center, Headquarters (4101) - Phone: (202) 260-7786.

### 1.2.1   Project Overview

Under the Federal Water Pollutant Control Act Amendments for 1972, EPA, in coordination with the States, was authorized to issue permits to facilities discharging pollutants into the country's navigable waterways and to limit the amount of pollutants discharged.  The National Pollution Discharges Elimination System (NPDES) requires each permitted facility to periodically monitor its discharges and report the results to EPA regional or state enforcement personnel using a Discharge Monitoring Report (DMR).

The regulated facilities are self-monitoring.  Each permittee monitors the levels and types of pollutants discharged and reports them to EPA Regions or NPDES delegated states.  The DMR details the results of facilities self-monitoring activities.  Upon receipt of the DMR, EPA Regions or NPDES delegated States enter the data into the Permit Compliance System (PCS).  PCS is one of EPA's largest computerized information systems, with approximately 15 million individual records in its data base.  PCS serves six major purposes in support of the planning and implementation of the NPDES program.  Some of the functions of PCS include:

- Maintaining an inventory of NPDES permittees;

- Providing data for Congress, State legislatures, and the general public;

- Supporting effective NPDES program implementation;

- Promoting sound planning, evaluation, and decision-making;

- Facilitating the use of NPDES-reported data; and

- Contributing to the formulation of NPDES policy and regulations.

The DMR form contains information on sample discharge data. Facilities voluntarily report discharge levels of regulated pollutants (conventional, toxic, and unconventional) as provided for in the 25 data elements of the DMR form. The DMR data is loaded into PCS. A comparison of the actual pollutant discharge levels, to the levels allowed by the facility's permit, is performed by PCS. The DMR data is used by PCS to determine facility compliance with the issued permits.

The EPA Regions and NPDES states are responsible for maintaining a current and accurate PCS data base. Currently, submitting DMR forms and entering DMR data into PCS is largely a manual process. The DMR forms are submitted on a periodic basis as specified by their permit (the majority of DMRs are submitted on a monthly basis). Facility personnel physically complete the DMR form and mail the form to the regulating EPA Region or NPDES State. The DMR data is then manually keyed from the form into the PCS data base. This manual process has become increasingly time consuming and expensive for both EPA and its permitted facilities.

The entry of DMR data into PCS is accomplished using one of three methods: on-line data entry, microcomputer entry and upload, or batch data entry. On-line data entry is an interactive method of PCS input allowing users to input data directly into the EPA mainframe using terminal emulation. Microcomputer entry and upload is accomplished using PC data entry software. Batch data entry involves the entry of transactions into the system without interactive edit and correction. Regardless of the method used to enter and edit PCS transactions, data is initially stored in temporary "hold" files. On a biweekly basis, a PCS data base update job is executed which edits the data and enters the accepted transactions into the PCS data base. Upon the completion of this job, users receive an Update Audit Report that describes the actions taken by the update in processing their data. For each transaction, the status report provides a final verification that newly entered data has been successfully incorporated into the PCS data base and identifies previously undetected errors that need to be corrected (the rejected transactions).

Electronic Data Interchange (EDI) is offered as an alternative data entry mechanism for those NPDES facilities, Regions or States supplying DMR data to EPA, or specifically, the PCS on EPA's National Computer Center (NCC) mainframe. This document

provides guidance to those permittees (herein referred to as trading partners) who voluntarily elect  to submit DMR data electronically to EPA.

### 1.2.2  DMR EDI Objective

The objective of EPA's DMR EDI Program is to offer electronic reporting options to the regulated community who must submit DMRs to EPA. The information can be transmitted and loaded directly into the PCS data base.  This also provides both state and federal agencies easy access to current DMR information.

### 1.2.3  EDI Approach

The EPA has developed an approach to EDI that will benefit all participants - the regulated community, the state environmental program offices, and service and product suppliers. This approach involves:

- Implementing EDI using ANSI ASC X12 standards;

- Using transaction sets 863 Report of Test Results, 997 Functional Acknowledgment, and 842 Nonconformance Report; and developing EPA-specific convention documents;

- Developing national standards for the implementation of EDI DMR; and

- Seeking voluntary collaboration with the NPDES permitted facilities.

The transmission of the discharge monitoring report through EDI is consistent with the Agency's electronic reporting (ER) policy.  Notice of EPA policy was published in the Federal Register, Notice No. FRL-3815-4, Volume 55, Number 146, July 30, 1990 and was entitled "EPA's Policy on Electronic Reporting."  This policy establishes a uniform EPA approach to electronic reporting by the regulated community.  In addition, the policy is intended to promote the adoption of electronic reporting by EPA programs and to ensure that as they implement this technology, they do so in a manner that is both consistent across the Agency and compatible with the current electronic reporting practices in the regulated community.

Refer to the EPA EDI Implementation Guideline, Section 1 for Agency-wide EPA EDI objectives.  For copies of the EPA EDI Implementation Guideline contact the EDI Team, U.S. EPA, Headquarters (2137), 401 M Street, S.W., Washington, D.C., 20460 or call (202) 260-4825.

## 1.3    Responsible Entity

EPA Headquarters, regions, and NPDES delegated states are considered the responsible entities under this Guideline.

## 1.4    Introduction to EDI

EDI is the transmission in ANSI ASC X12 syntax of information between computers of independent organizations.  The definition can be expanded further to include the electronic transmission of business documents from the application program of one computer to the application program of another computer within the framework of a standard format.  The key elements in this definition are computer-to-computer and standard format.  EDI reduces costs and errors associated with a paper document environment.  It replaces mail delivery and reentry of documents with an electronic mailbox and delivery of business data directly to a Trading Partner's computer application program.

## 1.5    How to Use the Implementation Guideline

This implementation guideline follows the ASC X12 recommended format specified in the "ASC X12 Guideline for Electronic Data Interchange EDI Implementation Reference Guidelines", approved  February 1991, ASC X12 D/90-856.  Chapters 1-10 of this document contain information necessary for the Regions and NPDES states and their trading partners to fulfill the requirements for implementing the exchange of DMR data utilizing EDI.  These sections include the EDI business background and history, as well as EPA policy and logistic issues that should be addressed.  The appendices contain a checklist on how to get started with EDI DMR, and provide conventions of the specific X12 transaction sets to satisfy the EDI information requirements for transmittal of a DMR electronically.

## 1.6    References

Questions, comments, and suggestions regarding this DMR EDI Implementation Guideline may be referred to:

> Office of Enforcement and Compliance Assurance
> U.S. Environmental Protection Agency
> 1200 Pennsylvania Avenue, N.W.
> Washington , DC 20044
> (202) 564-7277

Standards publications, guidelines and technical reports disseminate the technical and logical concepts reflected in the X12 Standards.  DISA (*Data Interchange Standards Association*) publishes a catalog of the available standards.  *Part I* is a document titled "An Introduction to Electronic Data Interchange".  *Part II* is the catalog of the ASC X12 Publications.

General or Technical questions about Electronic Data Interchange, ASC X12, ASC X12 Standards and Updates, international standards, or DISA can be directed to:

**Data Interchange Standards Association, Inc (DISA)**
Technical Department
1800 Diagonal Road, Suite 200
Alexandria VA 22314-2852
Fax: (703) 548-5738

## SECTION 2 - BUSINESS ISSUES

### 2.1    Implementation Considerations

DMR implementation uses the following ASC X12 Transaction Sets referenced in the EPA EDI Implementation Guideline:

863     Report of Test Results
997     Functional Acknowledgment
842     Nonconformance Report

These transaction sets are mapped in detail in the Appendices of this document.

### 2.2    Timing of Transactions

The EDI DMR must be received by the regions and NPDES delegated states in accordance with each individual state's DMR submittal date.  Trading partners can transmit data at any time.  EDI DMR transaction sets are submitted and retrieved at least once daily.   A transaction set 997 Functional Acknowledgment is generated to confirm receipt of translatable data.  The date and time stamp is considered to be the time at which the corresponding 997 is generated.  The 997 does not acknowledge the validity of the data, only its receipt.  The PCS data base updates twice weekly.  If a trading partner wants to ensure that a DMR transmission is included in a particular update cycle, the transmission should be sent in a timely manner to assure that a transmission can be successfully translated before the scheduled update.

If a 997 Functional Acknowledgment is not received, it is the responsibility of the Trading Partner to assure that their transaction was received in translatable format.  The transmission of a transaction set 997 does not require an acknowledgment in return.

Each transmission should be retained in both translated and transmitted format by the trading partners to assure a history of  the data transmitted and received is maintained. After a transaction set 997 Functional Acknowledgment is received, records of the transmission can begin normal archiving procedures.  Reference the DMR Terms and Conditions Agreement (TCA) for more information.

PIN violations will be reported to the trading partner as an 842 Nonconformance Report transaction as they are identified, usually daily.  After the DMR is uploaded to PCS, the PCS edit program generates error messages will also be transmitted to the trading partner as an 842 Nonconformance Report. The 842 transaction will be sent after the data is first processed by PCS Live Edit which normally occurs daily.  Another 842 may be returned as a result of the Live Update function of PCS which occurs twice a week.

## 2.3    Modes of Operation

The two modes of operation are production and test.  Production is used when both parties agree both systems are communicating the agreed upon data for the transaction sets implemented.  The test mode is used when implementing a new transaction, when making a modification to implemented transactions, or when upgrading to a new version/release.  The Trading partners should be aware of when the test mode will be used in order to provide assistance to each other.  Identification of the mode of operation is contained in the ISA (Interchange Control Header) Position ISA15, Data Element I14.  A "P"  identifies production data and "T" identifies test data, (refer to Section 10.2 of this document).  Trading partner systems must have the provision to handle both production and test transaction sets.

## 2.4    Security

The EDI process must include all steps necessary to ensure that the records are authentic, are properly authorized, and are retained in a manner that will ensure the integrity of the records.  Audit trails must be maintained for accountability.

The EDI DMR uses a Personal Identification Number (PIN) that is issued, managed, and validated by EPA Headquarters and Regions.  The PIN identifies the person authorizing the electronic submission of the DMR.  It is equivalent to the signature of the principle executive officer on the paper DMR.

Trading partners are responsible for keeping all PINs and Value Added Network (VAN) log-on and local dial-up access numbers secure.  If the trading partner suspects a security breach, they must contact the appropriate regional or state NPDES staff member immediately.  EPA reserves the right to change Trading Partner PINs at any time.  Please see the EPA EDI Implementation Guideline, Section 2.4 for additional security considerations.

## 2.5    Backup and Recovery Procedures

Backup and recovery procedures are necessary to provide:

- Retransmission capabilities;

- Translator re-run capabilities;

- Minimum 24- to 48-hour immediate access backup; and

- Archive and recovery capabilities for individual EDI transactions.

The backup and recovery procedures must be thoroughly documented to allow anyone with the proper authority to access the system to retransmit data.

It will be up to each EDI trading partner to keep their own records and archives of EDI transactions sent and received.  Either partner must have the capability to retransmit an EDI message.
The 997 Functional Acknowledgment transaction set can be used to provide a level of automation in the backup and recovery area.  If the EDI system expects to receive a Functional Acknowledgment for every transaction it sends, the EDI message should be available for retransmissions until a 997 corresponding to a specific EDI message is received.  Once the 997 Functional Acknowledgment is received, the original EDI message can be archived regardless of the normal archive timing.  The Agency requires the use of the 997 Functional Acknowledgment.  The 997 is used to confirm receipt of the trading partner's 863 transmission and indicate acceptance or rejection of the transaction set by the translator.  A Functional Acknowledgment is not required for receipt of Functional Acknowledgments; nor is it required for a trading partner's receipt of a 842 Nonconformance Report.

Alternative plans must be developed to accommodate extreme problems such as the loss of a data center, a local phone switch, or a catastrophic act of nature that prevents the exchange of  transmissions for an extended period of time.  Alternatives may include use of a different third party mailbox or direct asynchronous or bi-synchronous transmissions.

## 2.6     Audit Considerations

Trading partners should maintain an adequate audit trail to ensure that they can substantiate, when needed, information exchanged electronically.  In an information systems environment, an audit trail typically focusses on the transactions within the system--the data processed, input/output devices accessed, and the date and time that activities occurred.  Documents in paper-form are usually available to validate information input to or output from the automated information system.  In the EDI environment, paper-based documents, such as purchase orders, invoices, etc., no longer exist.  Therefore, an audit mechanism for the EDI environment must be more comprehensive to substantiate the information transmitted and received electronically.  An EDI audit trail is a full set of records (maintained in either electronic or paper form) documenting the data received, sent, retained, and stored.  This set of records must accurately reflect the actual events as they occurred.

Trading partners have multiple audit controls that they can take advantage of.  They can use error and exception reporting as an audit mechanism to follow-up and resolve errors and exceptions.  VAN reports can be used as an audit trail to substantiate EDI transmissions.  VANs typically offer several different types of reports, including:

·        reports of all documents sent but not retrieved by trading partners,
·        statistical reports on all documents sent and received, and

·      receiver and sender status reports that document the status of all documents received and all documents sent.

A key audit control that trading partners should use is an electronic log of all their data transmissions.  This log should include the batch identifier, transaction set control numbers, a date and time stamp, sender and receivers identifiers, and the status of the transmission.  This log is used to ensure the integrity of the data transmitted and received.  Trading partners can use the data in this log to conduct completeness checks to ensure that all transactions are processed.  The transaction set control numbers, e.g., the control totals and unique sequence numbers in the trailer records, are used to verify that there are no duplicates or omissions.

## SECTION 3 - LEGAL CONSIDERATIONS

### 3.1 General Introduction

The DMR EDI project was established to provide an option to facilities to allow electronic submissions of DMR data to EPA.  Typically, the DMR is submitted in paper form.  Regulations require use of the "form" and "signatures".  The EPA has established an electronic signature policy that would allow for the elimination of the paper form in the future.

For more information on the legal considerations of using EDI with the EPA, refer to the EPA EDI Implementation Guideline.

### 3.2 Record Keeping

The EDI DMR project will facilitate the submission of reporting data from regulated facilities to their EPA regional or state NPDES program office.

Participating NPDES permittees should reevaluate their internal control systems in the context of EDI to assure internal accountability for data maintenance, including audit trail, transaction reconciliation, and backup capability.  The DMR record retention system should include the capability to maintain the following:

- Copies of all DMR transmissions must be retained for 5 years as with the paper DMR.

- DMR transactions should be retained in both the original and translated format in addition to normal application file retention.

- Transmission activity logs from the translator containing pertinent time information should be retained.

- All application programs used in the EDI DMR system should be retained for the life of the record retention.

- Records should be able to be retrieved in a form that can be admissible in any judicial or other proceedings.

### 3.3 Authentication

The use of Personal Identification Numbers (PIN) are required on DMR EDI documents. EPA headquarters or regions validate the PIN through internal EDI tables and through VAN mailbox security. The PIN on the EDI DMR transmission is the equivalent of the handwritten signature requirement on the paper DMR.

## 3.4 Trading Partner Agreement

Trading partner agreements (TPAs) are an important part of any EDI system. They serve as the "interface specification" between trading partners and provide specific details of the legal agreements that define how the electronic commerce is to be conducted. The DMR pilot used a generic TPA for all trading partners involved. EPA has developed a generic Terms and Conditions Agreement (TCA), a type of trading partner agreement, which is published in the Federal Register. Interested NPDES permittees, in states where EPA administers the NPDES program, may use EDI for DMR reporting by signing and mailing the DMR TCA to EPA and complying with its terms.

## 3.5 Third-Party Agreement

The EDI DMR is submitted to EPA's mailbox. Currently, EPA's mailbox is located on the AT&T Value Added Network (VAN). When searching for a VAN provider, the Trading Partner (the NPDES permittee) and a telecommunications provider should sign an agreement. The VAN of choice should be able to maintain all the audit and security considerations outlined in the EPA EDI Implementation Guideline.

## 3.6 Laws, Rules, and Regulations

When implementing EDI, users and their counsel should consider whether any special laws, rules or regulations apply to the users. Currently, there is no adequate or comprehensive source of EDI law, but there are a few sources of laws, rules and regulations that users may wish to consult. For more information, refer to the EPA EDI Implementation Guideline.

## SECTION 4 - ENVIRONMENTS

### 4.1    System Architecture

The trading partner initiates the EDI DMReport  process by generating a DMR from either its data base application or the EDI translation software.  If the DMR is generated in a data base application, the trading partner needs to run an application interface program, which takes the data base output and reformats the data into an ASC X12-formatted file and loads the data to the EDI translation software.  The EDI translation software translates the entered data or data base generated data and translates the DMR information into the 863 Report of Test Results per the DMR EDI convention.  The 863 Report of Test Results is sent by the trading partner through the VAN to the EPA mailbox.

The following outline organizes the steps that are needed to report DM R information using EDI.  This is then followed by a detailed discussion of the procedures involved in each step.

a)    DM R information is collected by the trading partner and retained until it is ready for reporting to their EPA region or NPDES state.  A copy of the paper DMR form can be found in *Figure 4.1.1*.

b)    Trading partner initiates exchange by creating a DMR in EDI format.

c)    EDI DMR uploaded to VAN service by trading partner.  (Trading partner retains audit copy of complete message).

d)    EDI DMR retrieved from VAN service by Enterprise Technology Services Division  (ETSD).

e)    ETSD verifies the EDI message, translates it, and loads the information to the DMR application system for final processing.

f)    Audit copies of  the message are retained by ETSD.

g)    The ETSD application system generates a transaction set 997 and uploads the message to the VAN service for delivery to the trading partner.  An audit copy is retained of the response message.

h)     Where necessary, EPA and NPDES states make data updates to their application system data base, and then requests re-transmission from the trading partner.  This can occur when the trading partner sends information that either does not exist or match the reference information in the application system.

A schematic of the Discharge Monitoring Report EDI flow is shown in *Figure 4.1.2*. For comparison purposed, a diagram of the paper DMR flow appears in *Figure 4.1.3*.

Initial DMR Data Creation

The trading partner initiates the EDI DMR process by generating a DMR in EDI format from either its own application system (from the data used in processing the paper DMR forms) or by loading the same DMR data into a commercially available piece of EDI translation software (the EDI translation software will translate the data into the 863 Report of Test Results per the DMR EDI convention).  The resulting 863 Report of Test Results is sent by the trading partner through the VAN to ETSD.  The VAN interaction is usually done via a local telephone dial-up access number utilizing the communication module in either the EDI translation software or in access software provided by the VAN service. Hardware requirements include an internal/external modem on the computer system with access to a telephone line.

DMR Processing

Messages are retrieved from the mailbox at least once a day.  The 863 transaction set is translated by EDI translation software to their application format.  As in a paper process, the receiver time-stamps the receipt of the document.  Receipt of the document is defined as the time when the document is retrieved and successfully translated from the VAN mailbox.  The receiver acknowledges 863 transaction sets by a 997 Functional Acknowledgment sent to the trading partner's mailbox.  The data is then checked for accuracy.

Error Reporting

Invalid PINs and other PCS error messages detected by the Live Edit are currently reported to the EPA region or NPDES state.  This information will be reported directly to the trading partner by the transmission of an 842 Nonconformance Report transaction.

The transaction will follow the reverse process of the DMR submission transaction. The error messages are translated into the 842 transaction set format, sent to the EPA VAN and distributed to the trading partner's VAN mailbox.  The trading partner is then notified to pickup and translate the message.  The 842 convention document can be found in Appendix D.

Data Corrections and Amendments

The trading partner can retransmit a 863 transaction set to replace a previously submitted DMR.  The trading partner  modifies the 863 transaction previously submitted and transmits the DMR as outlined above, but changing the transaction type code (BTR01=05)  to indicate a re-submit.

## 4.2    Application Integration

Application refers to the current functional processes which may or may not be automated.  To take full advantage of EDI, it should become part of the functional processes and not an add-on.  Planning for integration will reduce the impact of this change and allow a smooth transition to an environment which maximizes your return on investment.  Total integration does not have to be achieved before starting EDI, but it should be an established goal.  Failure to achieve integration will result in the attainment of some short-term benefits, but the real benefits which come from increased automation will be unattainable.

## 4.3    Translation

Translation is the automated process of converting application data in a proprietary format to X12 Standard formats for sending transactions.  The process is reversed when transactions are received in the X12 formats. The core translation program uses table driven subroutines to generalize processing regardless of the actual application being processed.  The ASC X12 standard provides a specific structure for the data.  It does not affect the program design or the program function.  As a consequence, there are many commercial software packages which provide core translation and other related functions that are designed to support different EDI environments.

Some of the factors to be considered  when deciding whether to make or to buy translation software are the efforts required for programming, maintenance, testing, incorporating upgrades to the X12 Standard, and the development of the administrative programs necessary to satisfy  EDI audits.  The availability of relatively

inexpensive proven commercial software packages supported by a growing industry should make development unnecessary.  EDI software should be managed as system software rather than application software.

Figure 4.1.1  Discharge Monitoring Report

Figure 4.1.2  EDI DMR Data Flow
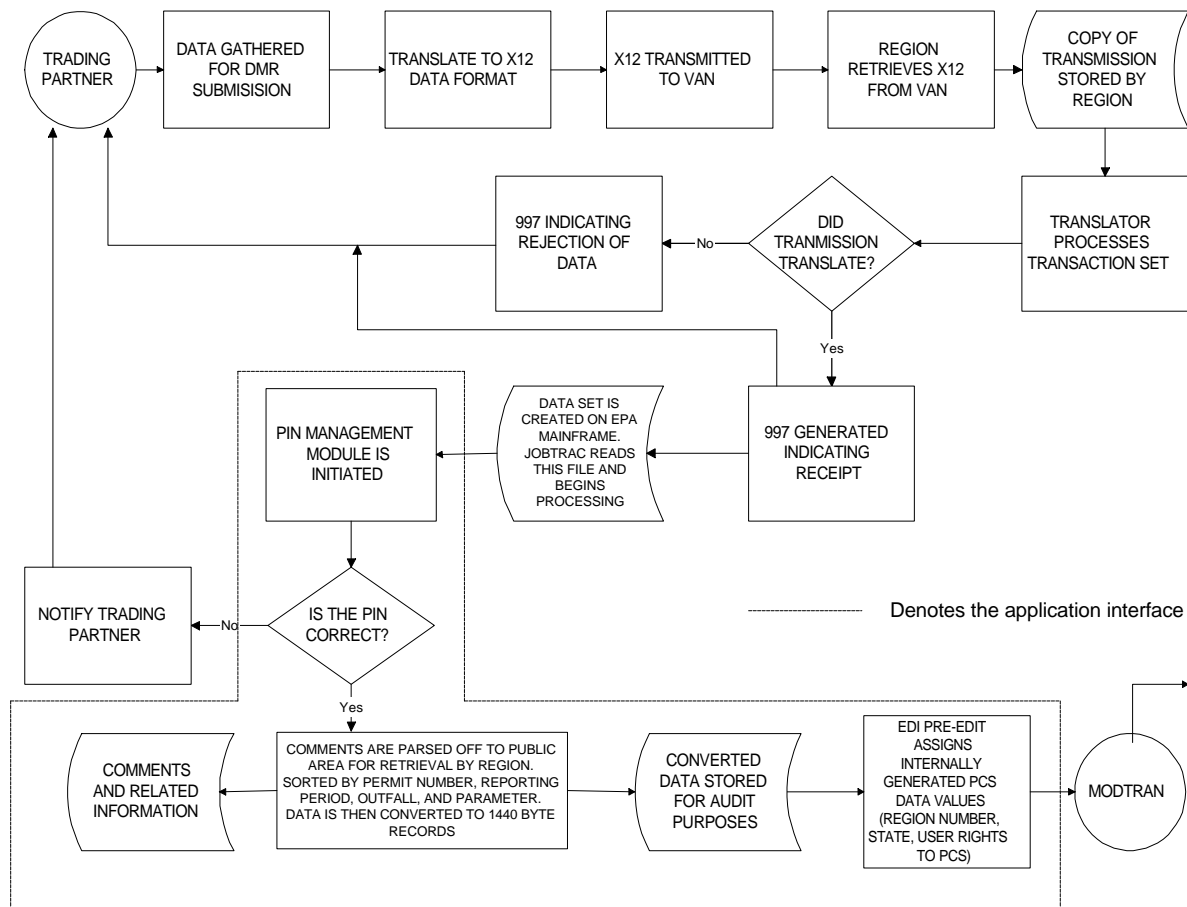


DATA FLOW OF DMR EDI PILOT PROJECT, PAGE 1 OF 2

Figure 4.1.2 EDI DMR Data Flow (Continued)
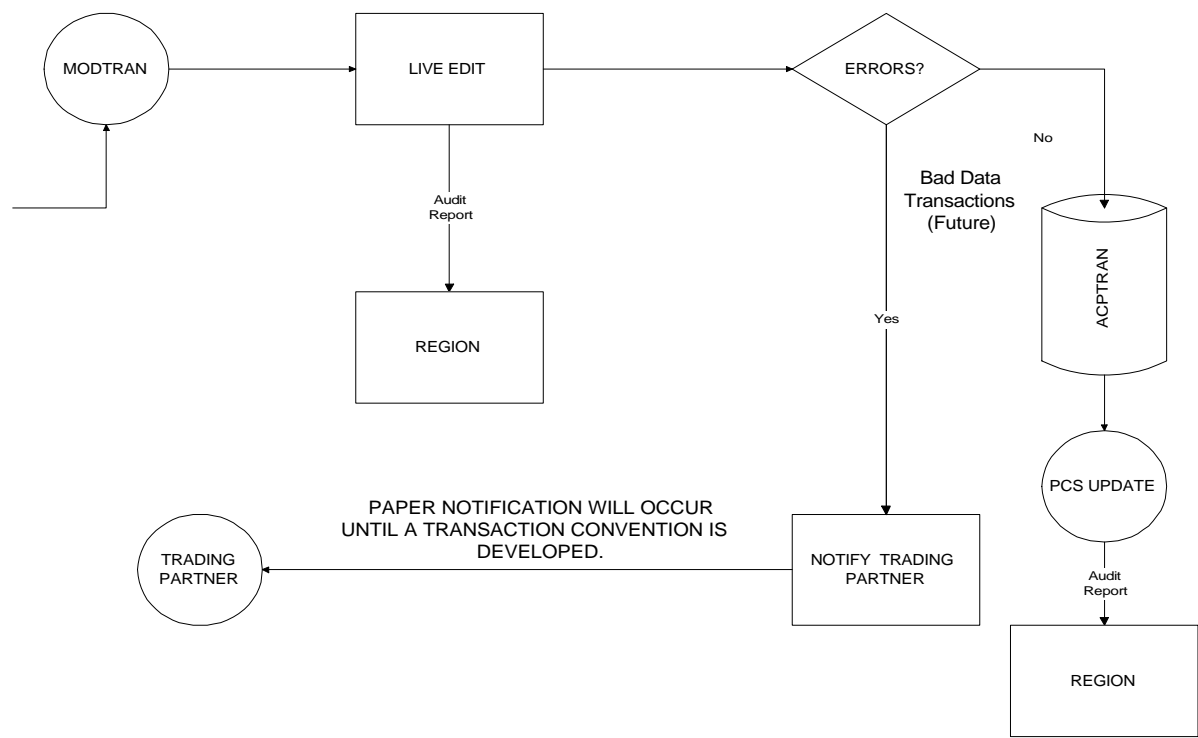


DATA FLOW OF DMR EDI PILOT PROJECT, PAGE 2 OF 2

Figure 4.1.3 Paper DMR Data Flow
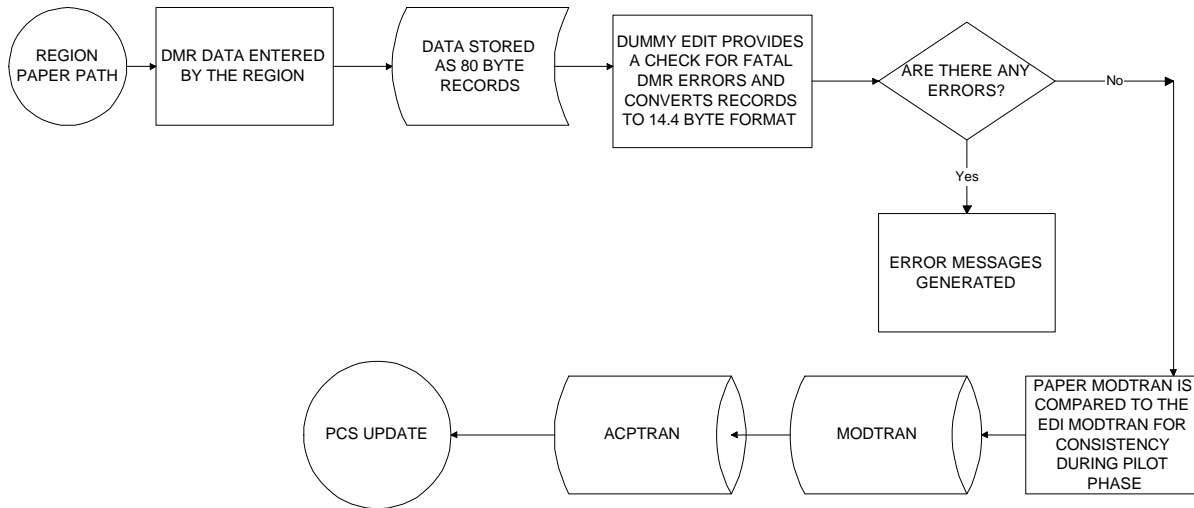
DATA FLOW OF PAPER DMR PROCESS

## SECTION 5 - MAINTENANCE

### 5.1    Maintaining Guidelines

The U.S. EPA in conjunction with regions and NPDES states is responsible for maintaining the DMR EDI Implementation Guideline.  Regions and NPDES states notify trading partners of changes affecting existing EDI DMR document conventions or document transfer.

### 5.2    Maintaining ASC X12 Standards

ASC X12 has a standard procedure for developing new transaction sets and maintaining existing sets.  Refer questions to the EPA EDI coordinator of the program office responsible for the project.  Should additional information be required, the question will be referred to:

> **Data Interchange Standards Association, Inc (DISA)**
> Technical Department
> 1800 Diagonal Road, Suite 200
> Alexandria VA 22314-2852
> Phone: (703) 548-7005
> Fax: (703) 548-5738

### 5.3    Version/Release

The version/release for the transaction sets used are found on the first page of each Transaction Set appendix.

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## SECTION 6 - COMMUNICATIONS

### 6.1    General Introduction

The transport of information in an EDI environment may be done physically or by telecommunications.  Physical means include the use of magnetic tape or courier service.  Data communication means the use of a public or private telecommunications.

Each exchange method should be analyzed to determine whether or not the approach meets the trading partners' communication needs.  No matter which approach is selected, a contingency plan should be formulated to address the possible event of a communication failure.

Issues to consider are procedures to address system failures, transmission error recovery including establishing the maximum number of retransmission attempts, security, network response time, and error reporting.

Section 6 of the EPA EDI Implementation Guideline provides an overview of the communication options available to trading partners planning to implement EDI.

### 6.2    Protocols

Protocols are a set of conventions between communicating devices. Simple protocols define only hardware configuration, more complex protocols define timings, data formats, error detection, and correction techniques.  For more information on protocols, see the EPA EDI Implementation Guideline.

### 6.3    Point-to-Point

Point-to-point or direct connect service is communication between two trading partners.  Point-to-point may employ dedicated circuits,  dial circuits, or a combination of  the two.  An EDI user that elects direct communication with trading partners must have the necessary in-house staff capable of managing the network and must address a number of issues with each individual trading partner.

An EDI user electing to implement direct connections must be aware that not all trading partners will have similar capabilities and therefore the trading partner may by necessity elect to use a third party service.   For more information, refer to the EPA EDI Implementation Guideline.

### 6.4    Third-Party Services

The  EDI DMR is submitted to the EPA's mailbox.  Currently, the EPA's mailbox is located on the AT&T VAN.  Refer to Section 3.5 of this document, and Section 6.4 of the EPA EDI Implementation Guideline, for more information regarding Third-Party Services.

### 6.5    Network Interconnects

Network interconnects are a viable means of exchanging data when each trading partner wishes to use their preferred VAN.  It is the responsibility of each partner to research whether their preferred VAN has the full complement of desired interconnect capabilities with the others.  This includes the ability to provide a full audit trail for tracking transmissions.

## SECTION 7 - MISCELLANEOUS

### 7.1    Industry Business Models

The following is an overview of the transaction sets used in the DMR process.  These documents mirror the information contained in the paper DMR documents.  It should be noted that the electronic documents DO NOT replace any legally required paper equivalents.  A Federal Register Notice will be published announcing that EDI DMR will be accepted in lieu of the paper DMR.

Although this document presents the anticipated practice and events for the exchange of documents pertaining to the DMR, this document can only serve as a guide.  Any discrepancy or inconsistency found should be clarified with the region or NPDES state for exact procedures.

In commercial use of EDI trading partners do not restrict themselves to a particular exchange model, and so may extend conventions to suit their circumstance.  This document however outlines the details required for meeting federally regulated reporting and therefore a trading partner must follow the region or NPDES state instructions to ensure compliance.

### Transaction Sets

The following ASC X12 Transaction Sets are used for submitting the DMR.  The detailed mapping is contained in individual appendices for each transaction set.

#### 863 Report of Test Results

The PCS receives pollutant discharge information from NPDES trading partner via this transaction set.  The information is utilized to track permit, compliance, and enforcement status.  See Appendix C for the detailed mapping.

#### 997 Functional Acknowledgment.

This transaction set communicates to the trading  partner that their transmission was received and the receiving party was able to translate the transactions.  The 997 does not guarantee the validity of the data submitted in a transmission, it only acknowledges receipt of the transmission.  Should a transmission be untranslatable, the 997 will identify the problem and communicate the errors to the transmitting party.

The return of 997, indicating a successful translation, also serves as the "postmark date" for the submission of an EDI DMR. See Appendix B for the detailed mapping.

**842 Nonconformance Report**

The PCS uses this transaction set to report back to the trading partner any PIN or errors detected during the PCS Live Edit processing. See Appendix D for the detailed mapping.

## 7.2 Related Business Topics

*Not currently used.*

## 7.3 EDI Vendor References

EDI is offered as a standard interface so trading partners, software manufacturers and value-added-networks can interact without concern for proprietary features. Trading partners must acquire the services of an X12 translator and communications software.

For the purpose of the DMR EDI Project, trading partners shall acquire the EDI software that best meets their needs for interfacing with the NPDES program offices and with other trading partners they may have.

EPA does not recommend or endorse any vendors translation or communication software. Listings of EDI software and service vendors can be obtained through ASC X12, EDI periodicals and trade journals. Several buyer's guides have been published that identify and provide details on commercially available EDI software packages.

Refer to Section 7.3 of the EPA EDI Implementation Guideline for more information regarding vendors products.

## SECTION 8 - GLOSSARY OF TERMS

**ANSI**,  American National Standards Institute.

**ANSI Standard**,  A document published by ANSI that has been approved through the consensus process of public announcement and review.  ANSI Standards are developed by committees accredited by ANSI (see ASC) and must be revisited by the developing committee within five years for updating.

**Area, Transaction Set**,  Identifies a defined area within a transaction set containing segments. The areas may be referred to as Table 1, Table 2, Table 3 or Header, Detail and Summary.

**ASC X12**,  Accredited Standards Committee X12.  Its purpose is to develop uniform standards for electronic interchange of business documents.  Membership is open to virtually all organizations and individual with a material interest in the standards.

**Authentication,**  A process whereby the receiver of a digital message can be confident of the identity of the sender and the integrity of the message.

**Compliance Checking**,  A checking process that is used to ensure that a transmission complies with ASC X12 syntax rules.

**Component Data Element**,  A data element used as a sub-element in a Composite Data Structure.

**Component Data Element Separator**,  Sometimes referred to as a sub-element separator.  A unique character that precedes each Component Data Element in a Composite Data Structure. It is specified by the sender in the Interchange Control Header (ISA).  The separator has a range of influence from this header to the next Interchange Control Trailer (IEA) segment. The sub-element must be different from the data element separator and segment terminator and once specified in the ISA segment must not appear in a data element value with the exception of its possible appearance in Data Element #785, Binary Data.  Within diagrams, the colon (:) is used to represent the separator character. Within diagrams, the colon (:) is used to represent the separator character.

**Composite Data Elements,**  One or more component data elements delimited by sub-element separators.

**Composite Data Structure,**  Structure that consists of two or more logically related component data elements in a defined sequence and delimited by a Component Element Separator.

**Condition Designator**,  An indicator assigned to each data element in a segment and defines how it is to be used in the segment.  Data elements may be designated as Mandatory (M), Optional (O) or Relational (X).  Refer to the ASC X12 Standards, X Segment Directory, Introduction.

**Control Segment**,  A control segment has the same structure as a data segment but is used for transferring control information for grouping data segments.  Control Segments are Loop Control Segments (L/LE), Transaction Set Control Segments (ST/SE), and Functional Group Control Segments (GS/GE), defined in X12.6 and Interchange Control Segments (ISA/IEA,TA1) defined in X12.5.

**Control Validation**,  Confirmation that information within the control segments is correct.

**Conventions**,  Common practices and/or interpretations of the use of the ASC X12 standards, complying with the standards, as agreed upon by two or more trading partners. Conventions define what is included in a specific implementation of an ASC X12 standard.

**Data Element**,  The smallest unit of information in the X12.  Data elements are defined in the Data Element Dictionary, X12.3.  Each data element is identified by a reference number.

**Data Element Dictionary**,  Source document for Data Element specifications.  Its official name is X12.3 Data Element Dictionary.  The dictionary specifies the name, description, and minimum/maximum length for each data element.  For ID-type or code type data elements, the dictionary lists all code values and their definitions or indicates in an appendix where the valid code list can be obtained.

**Data Element Length**,  Number of character positions available to represent the data element value.  A data element may be of variable length with range from minimum to maximum, or it may be of fixed length in which the minimum is equal to the maximum.

**Data Element Reference Number**,  Reference number assigned to each data element as a unique identifier.  Numbers prefixed with a "C" or an "S" indicate a Composite Data Element. Lack of a prefix indicates indicate a Simple Data Element.

**Data Element Separator,**  A unique character preceding each data element that is used to delimit data elements within a segment.  It is specified by the sender in the Interchange Control Header (ISA).  The separator has a range of influence from this header to the next Interchange Control Trailer (IEA) segment.  The data element separator must be different from the component or sub-element data separator and segment terminator and once specified in the ISA segment must not appear in a data element value with the exception of its possible appearance in Data Element #785, Binary Data.  Within diagrams, the asterisk (*) is used to represent the separator character.  See "Delimiters".

**Data Element Type**,  An identification which describes the format of the data in the element. A data element may be one of eight types: Numeric (N), Decimal (R), Identifier (ID), String

(AN), Date (DT), Time (TM), Binary (B), or Fixed Length String (FS).  Refer to X12.3 Data Element Dictionary, Introduction.

**Delimiters**,  Delimiters are bit configurations that are used as data element separators, component or sub-element separators and segment terminators.  The design of X12 is based on the concept of variable lengths.  Delimiters are necessary to identify the start of data elements and sub-elements and to identify the end of segments.  They are specified by the sender in the Interchange Control Header (ISA).  They have a range of influence from this header to the next Interchange Control Trailer (IEA) segment.  Delimiters are agreed upon by the Trading partners.  The instance of the terminator must be different from the instance of the data element separator which must be different from the component (sub-element) element separator.  Once specified in the ISA segment they must not appear in a data element value with the exception of its possible appearance in Data Element #785, Binary Data.

**DISA**,  Data Interchange Standards Association.  A not-for-profit organization which serves as the Secretariat for ASC X12 and the Pan American EDIFACT Board(PAEB).  It is accredited by ANSI to administer the U.S. Technical Advisory Group on matters pertaining to EDIFACT syntax before the International Organization for Standardization's(ISO's) Technical Committee 154.

**Direct Transmission**,  The exchange of data from the computer of the sending party directly to the computer of the receiving party.

**DMR,**  The Discharge Monitoring Report is a form used by National Pollution Discharge Elimination System (NPDES) permitted facilities to report discharges into navigable waterways.

**Draft Standard for Trial Use (DSTU)**,  A document approved by the full ASC X12 committee following membership consensus and subsequent resolution of negative votes and approved for publication by the Procedures Review Board.  DSTU's must be submitted to ANSI periodically for approval as National Standards.  See ANSI Standard.

**EDI Translation**,  The conversion of application data to and from the X12 standard format.

**EDI Translator**,  Computer software used to perform the conversion of application data to and from the X12 standard format.

**Electronic Data Interchange (EDI)**,  The computer application to computer application exchange of business information in a standard format.  An EDI transmission is a highly structured message intended for automated processing by a computer.  All references to EDI under U.S. EPA programs refers to the utilization of ASC X12 standards.

**Electronic Envelope**,  Electronic package that contains a set(s) of documents sent from one sender to one receiver.  See Interchange Control Segments.

**Electronic Mailbox**,  A repository where an EDI transmission is stored for pickup or delivery.  Mail boxes may be within a third-party service provider's system or in an individual trading partner's domain.

**Encryption**,  A process of transforming clear text (data in its original, uncoded form) into ciphertext (encrypted output of a cryptographic algorithm) for security or privacy.

**EPA**,  The Environmental Protection Agency.  Also called USEPA for United States Environmental Protection Agency.  Established in 1970 by Presidential executive order, it brings together parts of various government agencies involved with the control of pollution. Note that some State environmental authorities may be called EPA also, as in Illinois EPA.

**FIPS PUB 161**,  Federal Information Processing Standard, Publication 161.

**Functional Acknowledgment**,  A transaction set (997) transmitted by the receiver of an EDI transmission to the sender, indicating receipt and syntactical acceptability of data transmitted according to the ASC X12 standards.  The functional acknowledgment allows the receiving party to report back to the sending party problems encountered by the syntax analyzer as the data is interpreted.  It is not intended to serve as an acknowledgment of data content.

**Functional Group**,  A group of one or more transaction sets enclosed by a Functional Group Header (GS) segment and a Functional Group Trailer (GE) segment.  Each instance of a functional group applies to a specific business function defined by the specific application to which it applies.

**Functional Group Envelope**,  The envelope starting with a GS (Functional Group Header) Element and terminated with a GE (Functional Group Trailer) Element.

**Guideline**,  A document prepared by an EDI implementor that defines the use of the ASC X12 standards in the implementor's environment.

**Implementation Guideline**,  A document prepared by an industry group, association, institute, government body or individual trading partner that defines how the ASC X12 standards are used by that industry.

**Industry Conventions**,  A document prepared by an industry group, association, institute, etc. that defines how the ASC X12 standards are used by that industry.

**Interchange**,  A transfer of data between trading partners.

**Interchange Control Envelope**,  The outer envelope that holds multiple functional group envelopes in an ASC X12 transmission.

**Interchange Control Segments,**  Segments that identify the boundaries of the ASC X12 formats in a transmission. Interchange Control Header (ISA) and Interchange Control Trailer (IEA) segments identify a unique interchange being sent from one sender to one receiver.

**Interchange Control Structure**,  The Interchange Control Header (ISA) and Interchange Control Trailer (IEA) segments envelope one or more functional groups or interchange related control segments and perform the following functions:  1) defines the data element separators and the data segment terminators, 2) identifies the sender and receiver, 3) provides control information for the interchange, and 4) allows for authorization and security information. (X12.5).

**Level**,  A term used to identify hierarchical positions in an ASC X12 design.  The levels used from highest to lowest are Communications, EDI Interchange, Functional Group, Transaction Set, Heading Area, Summary Area and Detail Area.  Reference ASC X12 publication DSTU X12.59 Implementation of EDI Structures - Semantic Impact.

**Loop**,  A group of segments related only by design of the transaction set.  Use of any segment within a loop requires the use of the first or parent segment of the loop.

**Mandatory (M)**,  A data element/segment requirement designator that indicates that the presence of a specified data element is required.

**Mapping**,  The process of identifying the relationship between the data elements in the standard transaction set and the data elements in the application..

**Max Use**,  The maximum number of times a segment can be used at the location in a transaction set.

**Message**,  Entire data stream including the outer envelope.

**Message Authentication,**  A mechanism that allows the receiver of an electronic transmission to verify the sender of the integrity of the content of the transmission through the use of an electronic "key" or algorithm, which is shared by the trading partners.

**National Pollution Discharge Elimination System (NPDES),**  This program is run by designated State Agencies or U.S. EPA Regions to monitor water pollution discharges.  This data, once collected, is maintained in the Permit Compliance System (PCS) of the U.S. EPA.

**OPPE**,  Office of Policy, Planning, and Evaluation is an organization within the U.S. EPA.

**Optional (O)**,  A data element/segment requirement designator that indicates that the presence of a specified data element/segment is at the option of the sending party, which can be based on the mutual agreement of the interchange parties.

**Permit Compliance System (PCS),**  This program is run by the U.S. EPA in support of the EPA Regions.  Its functions include maintaining an inventory of NPDES permittees; providing data for Congress, State legislatures, and the general public; supporting effective NPDES program implementation; promoting sound planning, evaluation, and decision-making; and, facilitating the use of NPDES-reported data.

**Personal Identification Number (PIN),**  A unique number assigned to a user for identification purposes.

**Qualifier**,  A data element that identifies or defines a related element. Qualifier elements are ID Type Elements.  The qualifier is a code taken from a list of approved codes.

**Relational (X),**  See Segment Directory.

**Repeating Segment**,  A segment that may be used more than once at a given location in a transaction  set. See Max Use.

**Security**,  System screening that denies access to unauthorized users and protects data from unauthorized uses.

**Segment**,  Variable length set of logically related data elements in a defined sequence, a unique segment identifier (which is not a data element), one or more data elements, each preceded by a data element separator, and a segment terminator.  Refer to X Segment Directory.

**Segment Directory (X)**,  The standard that provides the definitions and specifications of the segments used in the construction of transaction sets developed by ASC X12.  The directory lists each segment by name, purpose, identifier, the contained data elements in the specified order, and the requirement designator for each data element.

**Segment Identifier**,  A unique identifier for a segment composed of a combination of two or three letters or digits.  The segment identifier occupies the first character positions of the segment.  The segment identifier is not a data element.

**Segment Terminator**,  A unique character appearing at the end of a segment to indicate the termination of the segment.  It is specified by the sender in the Interchange Control Header (ISA).  The segment terminator has a range of influence from this header to the next Interchange Control Trailer (IEA) segment.  The segment terminator must be different from the data element and sub-element separators and once specified in the ISA segment must not appear in a data element value with the exception of its possible appearance in Data Element #785, Binary Data.  Within diagrams, the notation "N/L" is used to represent the segment terminator.

**Standards**,  Standards are the technical documentation approved by ASC X12, including Transaction Sets, Segments, Data Elements, Codes and Interchange Control Structures. Standards provide the structure for ASC X12.

**Sub Element Separator**,  Sometimes referred to as a Component Data Element Separator. A unique character that precedes each Component Data Element in a Composite Data Structure.  It is specified by the sender in the Interchange Control Header (ISA).  The separator has a range of influence from this header to the next Interchange Control Trailer (IEA) segment.  The sub-element must be different from the data element separator and segment terminator and once specified in the ISA segment must not appear in a data element value with the exception of its possible appearance in Data Element #785, Binary Data. Within diagrams, the colon (:) is used to represent the separator character.

**Syntax**,  The grammar or rules that define the structure of the EDI standards (i.e., the use of loops, qualifier, etc.).  Syntax rules are published in ANSI X12.6.

**Trading Partner Agreement (TPA),**  Contractual agreements between tow entities that contemplate trading electronically.

**Trading Partner**,  The sending and/or receiving party involved in the exchange of electronic data interchange transmissions.

**Transaction Set,**  The transaction set unambiguously defines, in the standard syntax, information of business or strategic significance and consists of a transaction set header segment, one or more data segments in a specified order, and a transaction set trailer segment.

**Transaction Set ID**,  An identifier that uniquely identifies the transaction set.  This identifier is the first data element of the transaction set header segment.

**Translation**,  The act of accepting documents in other than X12 standard format and converting them to the X12 standard format.

**Transmission Control**,  Defines how information is transmitted across communications lines and includes routing and recommendations.

**VAN,**  Value Added Network.  Third-party service organizations.

**Version/Release,**  Identifies the publication of the standard being used for the generation or the interpretation of data in the X12 standard format.  May be found in the Functional Group Header Segment (GS) and in the Interchange Control Header Segment (ISA).  (E.g., Version 003040 means Version 3 Release 4.)   See Control Segment.

**X12**,  The ANSI committee responsible for the development and maintenance of standards for Electronic Data Interchange (EDI).

**X12.5**, Interchange Control Structures.  This standard defines the control structures, the interchange envelope of a header (ISA) and trailer (IEA) for the electronic interchange through a data transmission, and it provides a structure to acknowledge the receipt and processing of this envelope.

**X12.6**, Application Control Structure.  This standard defines the structure of business transactions for computer-to-computer interchange.

## SECTION 9 - FORMS AND DOCUMENTS

### 9.1    ASC X12 Transactions

The DMR EDI Project complies with the ASC X12 standards for Electronic Data
Interchange.  The EPA DMR process supports the following ASC X12 standards at
this time:

    ISA/IEA, GS/GE, ST/SE Header and Trailer Formats;
    863 Report of Test Results (X12.41);
    997 Functional Acknowledgment (X12.20); and
    842 Nonconformance Report.

### 9.1.1   Header/Trailer Format

The EPA has defined the elements to be used in the Interchange Control
Header/Trailer (ISA/IEA), Functional Group Control Header/Trailer (GS/GE), and the
Transaction Set Header/Trailer (ST/SE) for all transmissions to and from the State
NPDES Program Office.

The interchange header and trailer segments envelop one or more functional groups or
interchange related control segments and perform the following functions:

- Define the data element separators and data segment terminators;

- Identify the sender and receiver;

- Provide control information for the interchange; and

- Allow for authorization and security information.

### 9.1.2   863 Report of Test Results Transaction Set

The 863 Report of Test Results transaction set is used to reproduce the Discharge
Monitoring Report.  The transaction set has two functions: the first captures the
information as it appears in hard copy, and the second generates the flat file for the
Region or NPDES State.

The 863 Report of Test Results received by the Region or NPDES State is acknowledged with a 997 Functional Acknowledgment.  More information on the 863 is located in Appendix C.

### 9.1.3   997 Functional Acknowledgment Form

A 997 Functional Acknowledgment is sent by the Region or NPDES State to the Trading Partner in response to the receipt of an 863 Report of Test Results.  The 997 does not guarantee the validity of the data sent in the 863 Report of Test Results. More information on the 997 is found in Appendix B.

### 9.1.4   842 Nonconformance Report Transaction Set

An 842 Nonconformance Report is sent by PCS to the Trading Partner to report PIN or PCS errors that have been identified.  A Functional Acknowledgement is NOT required in response to the 842.  More information on the 842 is found in Appendix D.

### 9.2   ASC X12 Documents

The following ASC X12 documents should be referenced for additional information standard format and implementation issues.

ASC X12 Draft Standards
Version 003 Release 050
Document Number ASC X12S/90-856
Available through:

> Data Interchange Standards Association, Inc. (DISA)
> 1800 Diagonal Road, Suite 200
> Alexandria, VA  22314-2852
> Phone:  (703) 548-7005
> FAX:    (703) 548-5738
>
> or:
>
> EDI Support Services, Inc.
> P.O. Box 203
> Chardon, OH  44024-0203
> Phone:  (800) 334-4912

**9.3      Sample of DMR (EPA Form 8700-02 (Rev. 9-88)**

### 9.4 PCS Code Tables

PCS Code Tables used in this implementation are found in the PCS Codes and Descriptions maintained by the U.S. EPA.  The tables used are:

| | |
|---|---|
| Table 050 | Frequency of Analysis Codes |
| Table 080 | Monitor Location Codes |
| Table 150 | Sample Type Codes |
| Table 160 | Parameter Type Code |
| Table 180 | Measure Unit Codes |
| Table 490 | No Discharge Indicator Codes |

### 9.5 Mapping of DMR Data Items to ASC X12 Segments

Table 1 represents the listing of field information in the order that it appears in the EDI DMR.  Presented in the table is the associated ASC X12 Segment and Looping Hierarchy selected for describing the data in the ASC X12 format.

## TABLE 1

| EDI Segment | EDI Loop | Table or Note | Column or Note | Data Entity/Field Name | Notes |
|---|---|---|---|---|---|
| | | | | | |
| GS01 | | | 'TR' | Functional ID | |
| GS02 | | | Not Used | Sender ID | |
| GS03 | | | Not Used | Receiver ID | |
| GS04 | | | Not Used | Group Date | |
| GS05 | | | Not Used | Group Time | |
| GS06 | | | Not Used | Group Control Number | |
| GS07 | | | 'X' | Standard Body | |
| GS08 | | | '003041' | Version Release | |
| ST01 | | | '863' | Segment ID | |
| ST02 | | | Calculated | TSCN | |
| BTR01 | | TRXTYPE | 00 = Original 05 = Replace | Document edit code | 05 replaces entire DMR. |
| BTR02 | | | DMR creation date | Date | |
| BTR03 | | | DMR creation time | Time | |
| BTR04 | | DMR for NPDES | DJ = Discharge Monitoring Report | Report type code | |
| BTR05 | | BATCHID | | Reference # | Report reference # |

| EDI Segment | EDI Loop | Table or Note | Column or Note | Data Entity/Field Name | Notes |
|---|---|---|---|---|---|
| | | | | | created by sender. |
| BTR06 | | | | Reference # | Reference # of transaction replaced if BTR01=05. |
| NTE01 | | | NCD = Non-conformance Specification | Note/Special Instruction | Carries permit level notes or comments |
| NTE02 | | | Text | Free Form Message | |
| DTM01 | | MVDT | 090 = Report begin<br><br>091 = Report end<br><br>458 = Certification | Date/time qualifier | Monitoring period begin date.<br><br>Monitoring period end date.<br><br>Signature date |
| DTM02 | | YYMMDD | | Date | |
| DTM03 | | HHMMSS | Not Used | Time | |
| DTM04 | | | Not Used | Time code | |
| DTM05 | | | Not Used | Century | |
| DTM06 | | | Not Used | Date/Time period format qualifier | |
| DTM07 | | | Not Used | Date/Time Period | |
| N101 | N1 | | 8D = Permit holder<br><br>ZD = Recipient name | Entity ID code | |
| N102 | N1 | | Free form name of entity | Name | |
| N103 | N1 | Plant | 94 = Code assigned by the organization that is the ultimate destination of the transaction set. | ID code qualifier | Used when N101=ZD to specify a mail code. |
| N104 | N1 | | | ID code | Code from Region/State Route List when N101=ZD |
| N105 | N1 | | Not Used | Entity relationship code | |
| N106 | N1 | | Not Used | Entity identifier code | |
| REF01 | N1 | | PN = Permit # | Reference number qualifier | |
| REF02 | N1 | NPID | NPDES permit number of permit holder | Reference number | |
| REF03 | N1 | | Not Used | Description | |
| PER01 | N1/PER | Certifier / Prin-ciple Executive Officer or other Authorized | AA = Authorized Representative<br>CE = Certifier | Contact function code | See code list of DE #366 for an appropriate value to |

| EDI Segment | EDI Loop | Table or Note | Column or Note | Data Entity/Field Name | Notes |
|---|---|---|---|---|---|
| | | Agent | | | describe the person identified in N1(for title of Principle Executive Officer) |
| PER02 | N1/PER | | Text | Name | |
| PER03 | N1/PER | | TE = Telephone Number | Communication # qualifier | |
| PER04 | N1/PER | | Complete Telephone # | Communication # | Include country and/or area code if applicable. |
| PER05 | N1/PER | | Not Used | Communication # qualifier | |
| PER06 | N1/PER | | Not Used | Communication # | |
| REF01 | N1/PER/ REF | | 4A = PIN | Reference number qualifier | |
| REF02 | N1/PER/ REF | | The appropriate PIN | Reference number | |
| REF03 | N1/PER/ REF | | Not Used | Description | |
| LIN01 | LIN | | | Assigned ID | Sequential number that identifies iteration of the loop. |
| LIN02 | LIN | | P5 = Material discharge number. | Product/Service ID qualifier | |
| LIN03 | LIN | VDSC+VDRD | Discharge # | Product/Service ID | |
| LIN04 | LIN | | Not Used | Product/Service ID qualifier | |
| LIN05 | LIN | | Not Used | Product /Service ID | |
| NTE01 | LIN | | NCD = Non-conformance Specification | Note/Special Instruction | |
| NTE02 | LIN | | Text | Free Form Message | |
| PID01 | LIN | | S = Structured from industry code list | Item description type | PID Segment is optional, for Pipe Level No Discharges. |
| PID02 | LIN | | 08 = Product (for PCS parameter code) 12 = Type and/or process (for PCS sample type code) 28 = Test sample frequency (for | Product/Process character code | At least one of "08" or "88" is required for each iteration of the LIN loop. |

| EDI Segment | EDI Loop | Table or Note | Column or Note | Data Entity/Field Name | Notes |
|---|---|---|---|---|---|
| | | | PCS frequency of analysis code) 29 = Test sample location ( for PCS monitoring location code) 88 = Flow (for PCS no discharge indicator code) | | |
| PID03 | LIN | | EP = U.S. EPA | Agency qualifier code | |
| PID04 | LIN | NODI VMLO VPRM RFRQ | The appropriate PCS code value. | Product description code | |
| PID05 | LIN | | Not Used | Description | |
| PID06 | LIN | | Not Used | Layer/position code | |
| PID07 | LIN | | PCS + the code table number | Source subqualifier | |
| PID08 | LIN | | Not Used | Yes/No response code | |
| MEA01 | LIN | | CT = Counts | Measurement reference ID code | |
| MEA02 | LIN | | Not Used | Measurement qualifier | |
| MEA03 | LIN | REXC | Number of excursions value | Measurement value | |
| MEA04 | LIN | | 1N = Count | Composite unit of measure | |
| MEA05 | LIN | | Not Used | Range minimum | |
| MEA06 | LIN | | Not Used | Range maximum | |
| MEA07 | LIN | | Not Used | Measurement significance code | |
| MEA08 | LIN | | Not Used | Measurement attribute code | |
| MEA09 | LIN | | Not Used | Surface/Layer position code | |
| MEA10 | LIN | | Not Used | Measurement method or device | |
| CID01 | LIN/CID | | TR = Length Type: Random | Measurement Qualifier | This segment used to start the LIN/CID Loop. |
| CID02 | LIN/CID | | Not Used | Product / Process characteristic code | |
| CID03 | LIN/CID | | Not Used | Agency qualifier code | |
| CID04 | LIN/CID | PCS Code Table | Not Used | Product description code | |
| CID05 | LIN/CID | | Not Used | Description | |
| CID06 | LIN/CID | | Not Used | Source subqualifier | |
| CID07 | LIN/CID | | Not Used | Yes/No condition or response code | |
| MEA01 | LIN/CID/ MEA | Value | TR = Test results | Measurement reference ID code | |
| MEA02 | LIN/CID/ MEA | | CON = Concentration | Measurement qualifier | One or the other is required. |

| EDI Segment | EDI Loop | Table or Note | Column or Note | Data Entity/Field Name | Notes |
|---|---|---|---|---|---|
| | | | QUR = Reportable quantity | | |
| MEA03 | LIN/CID/ MEA | MQAV MCAV | The average value is reported here. | Measurement value | |
| MEA04 | LIN/CID/ MEA | | EA = Each | Composite unit of measure | Used as a dummy unit. PCS unit code is in LM/LQ loop |
| MEA05 | LIN/CID/ MEA | MCMN | Concentration minimum value | Range minimum | This element will be empty for quantity measurements. |
| MEA06 | LIN/CID/ MEA | MCMX MQMX | Quantity or concentration maximum value | Range maximum | |
| MEA07 | LIN/CID/ MEA | | 03 = Approximately 06 = Greater than 07 = Less than 23= Predicted | Measurement significance code | 03 is used only as a place holder for 'Estimated'. 23 is also used as a place holder for 'Too numerous to count'. Data maintenance will be requested for both of these codes. If MEA07 = 23, then either MEA03, MEA05, or MEA06 must = 99999. |
| MEA08 | LIN/CID/ MEA | | | Measurement attribute code | |
| MEA09 | LIN/CID/ MEA | | Not Used | Layer/position code | |
| MEA10 | LIN/CID/ MEA | | Not Used | Measurement method | |
| LM01 | LIN/CID/ MEA/LM | | EP = U.S. EPA | Agency qualifier code | This loop specifies PCS' unit of measure. |
| LM02 | LIN/CID/ MEA/LM | | PCS + the code table number | Source subqualifier | |
| LQ01 | LIN/CID/ MEA/LM | | Not Used | Code list qualifier code | |
| LQ02 | LIN/CID/ MEA/LM | RUNT RCUN | PCS unit of measure code | Industry code | |
| SE | | | | Transaction set trailer | Must be same value as ST02. |

## SECTION 10 - AGENCY CONVENTIONS,
## INTERCHANGE CONTROL & TRANSACTION SETS

### 10.1    Introduction

Section 10 contains the descriptions of the information used in the Interchange Header (ISA), Interchange Trailer (IEA), Group Start (GS), Group End (GE), and the control segments.

To help understand how the standards work, it is useful to begin by defining some terminology and explaining some of the components that make electronic communications possible. It is important to note that in the transaction set implementation guidelines all text shown in italics is an EPA Convention.  Non-italicized text contain definitions and comments directly from the X12 standards.

A "*transaction set*" is the term used in business data interchange to describe the electronic transmission of a single document (purchase order, Discharge Monitoring Report, shipping notice, etc.) between one organization's computer and the computer of the other trading partner.  The data included in a transaction set conveys the same information as a conventional printed document.

A *transaction set* generally but not always, consists of three areas - Header or Table 1, Detail or Table 2, and a Summary or Table 3.  The *Header Area* contains information that is of an administrative nature and pertains to the entire document (document dates, identities, names of contacts, etc.).  The *Detail Area* is used to convey the actual business transaction such as quantities, prices, items.  Data in the Detail Area overrides equivalent Header Area data ( i.e. if a contact is specified in the Header and another contact is specified with a single item, the second contact takes priority).  The *Summary Area* contains control information and may contain other data that relates to the entire transaction.

Transaction sets are a collection of a series of segments.  A *segment* is a group of data used to convey a logical grouping of data.  The data within a segment is contained within data elements.  A segment is the smallest discrete piece of data in the ASC X12 design.

Please note that in the design of Composite Data Elements, sub-elements are still referred to as elements.

EDI transmissions are created from information extracted from internal information systems, translated into ASC X12 format and punctuated with control characters. Quantity , unit of measure, unit price, catalogue number are typical purchase order or invoice information.  In an invoice transaction the information becomes a segment if five data elements grouped in a specific sequence as follows:

**IT1\*\*Quantity\*Unit of Measure Code\*Unit Price\*\* Product Service Qualifier\*Product/Service Identification N/L**

The ASC X12 format requires each element be separated by an element separator and the last element be followed by a segment terminator. Graphic representations of the control characters usually use the asterisk as a element separator, N/L as the segment terminator and a colon(:) as a sub-element separator.

The segment in an actual transmission would appear as:

**IT1\*\*1\*CA\*1.08\*\*CT\*141151 N/L**

In the ASC X12 code list "CA" is the unit of measure code for case, and "CT is the product identification qualifier for carton.

The following list identifies terms associated with data segments and provides references to codes and terms used in the X12 standard. The actual transmission does not include all of the listed items as only the segment identifier characters, the values for each data element, the data element separators and the segment terminator characters are transmitted.

**Segment Identifier**, Two or three characters assigned to identify the segment. The identifier occupies the first character positions of the segment.

**Data Element Reference Number**, A number assigned to the data element to provide a reference to the ASC X12 Data Dictionary which defines specifications for each data element.

**Data Element Reference Designator**, A structured code assigned to each data element in a segment to indicate its unique position in the segment. It is composed of the segment identifier and its sequential position within the segment.

**Data Element Name**, This is the name assigned to the data element in the ASC X12 Data Dictionary.

**Attributes**, Each data element has three ASC X12 attributes: element usage or Condition Designator, data element type, and Minimum/Maximum length.

**Condition Designator**

**M**     Mandatory
          The element is required to appear in the segment.

**O**     Optional

Appearance of the data element is at the option of the sending party or is based on the mutual agreement of the trading partners.

**X**    Relational

Condition that may exist between two or more data elements based on the presence or absence of one of the data elements. Additional codes are used to identify the condition i.e. P - Paired or Multiple, R - Required, E - Exclusion, C - Conditional, or L - list Conditional. Refer to the X12 Standards Manual, Introduction to X12.22 Segment Directory.

**Data Element Type**

**ID**    Identifier

The data element must always contain a value from a predefined
list of values that is maintained by X12 or by other bodies that
are recognized by X12 and identified by reference in Appendix
A in the Data Element Dictionary.  The value is left justified.
Trailing spaces should be suppressed.

**AN**  String

Alpha-numeric sequence of characters containing at least one
non-space character.  The significant characters must be left
justified.  Leading spaces, if used are assumed to be significant
characters.  Trailing spaces should be suppressed.

**FS**  Fixed Length String

A sequence of any letters, spaces, and/or special characters with
spaces filled, if necessary, to satisfy minimum length.

**DT**  Date

The format is YYMMDD where YY is the Year, MM is the
month and DD is  the day of the month.

**TM**    Time

Values for a time-type data element are in the HHMMSSd..d format expressed using the 24-hour clock.  HH expresses the hour(00-23), MM expresses the minute(00-59), SS the seconds(00-59), and d..d is the numeric expression of decimal seconds.

**Nn**    Numeric

Numeric data element where N indicates a numeric and "n" indicates the decimal places to the right of a fixed, implied decimal point.  The decimal point is not transmitted in the character stream.  If the max length of the data element was five position and the Type was N2, the values sent would always have two decimal positions; an N0 would contain no decimal positions.

**R**    Decimal

A numeric data element where the decimal point is optional for integer values, but required for fractional values.  Leading zeros should be suppressed unless necessary to satisfy a minimum length requirement. The decimal point and the minus sign when transmitted are not counted when determining the length of the data element value.  If the max length of the data element was three positions, the following represent the values that could be sent: NNN, .NNN, N.NN, NN.N, -N.NN,  etc.

**B**    Binary

Any sequence of octets ranging in value from binary 00000000 to binary 11111111.  Binary may only exist in the BIN Segment.

**Minimum/Maximum**, This is the range, minimum to maximum, of the number of character positions available to represent the data element value.  It may be of variable length with a minimum to maximum, or it may be of fixed length in which the minimum is equal to the maximum.

## 10.2    X12 EDI Transmission Control Structure

The X12 Transmission is a hierarchical structure of headers and trailers to allow transaction sets of different types to be transmitted in the same transmission and allows the data to be separated or segregated logically for easy interpretation and internal routing by the receiver.

*Transaction sets* begin with an ST segment and end with an SE segment.  Multiple transaction sets of the same functional group are transmitted together beginning such a group with a GS (Group Start) and ending with a GE (Group End) segment.  One or more functional groups are bound together for transmission within an interchange envelope that starts with an ISA segment and ends with an IEA segment.  There are

other segments available for Security and Interconnect control when using the services of third party communications providers (VANS).

The *interchange control structure* is the interchange envelope consisting of a Header (ISA) and a Trailer (IEA) for the electronic interchange through a data transmission, and provides a structure to acknowledge the receipt and processing of the envelope.

The ISA and the IEA envelope one or more functional groups or interchange-related control segments and perform the following functions:

- Define the segment terminator, and the element and sub-element separators.

- Identify the sender and receiver,

- Provide control information for the interchange, and

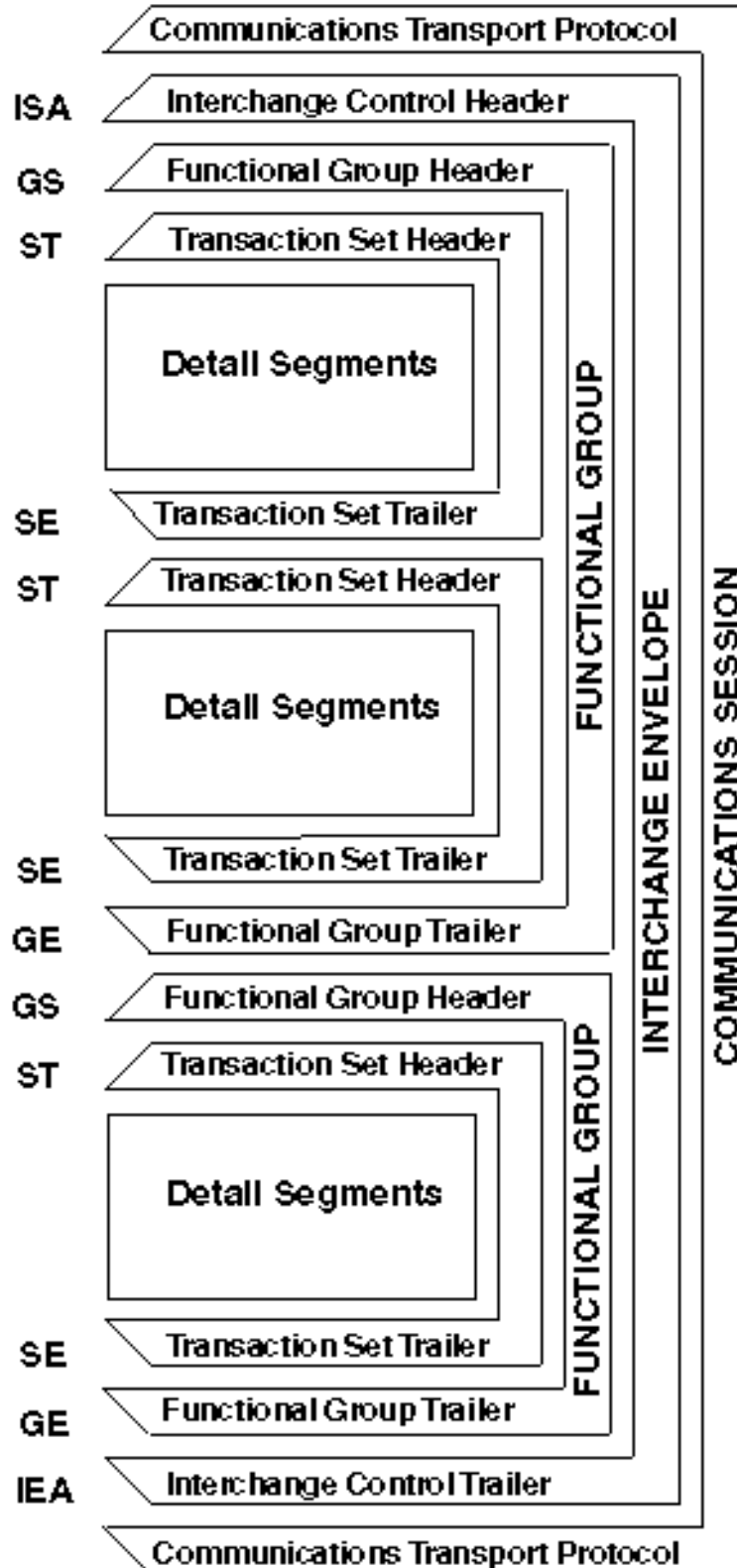- Allow for authorization and security information.

The GS and GE envelope transactions sets of the same type. Each type of transaction is contained in a separate Functional Group to allow the receiver to parse the information to the appropriate application. The GS segment provides the identity of the Version and Release of the standard used to create the transaction. Both the GS and the GE provide control information to ensure the validity of the interchange.

Every transaction set begins with an ST (Transaction Start) segment and is ended with a SE (Transaction End) segment.

Translators normally strip off the ISA/IEA and GS/GE segments during translation. It is the responsibility of the trading partners to make provision to archive the transmissions before and after translation to satisfy EDI Audit Requirements.

The structures of the transaction set and functional group headers and trailers are found in the Segment Directory. The structures of the interchange control header and trailer are found in the Interchange Control Structures section of any current version of the ASC X12 Standards.

## Schematic of an EDI Transmission

Communications Transport Protocol

ISA — Interchange Control Header

GS — Functional Group Header

ST — Transaction Set Header

**Detail Segments**

SE — Transaction Set Trailer

ST — Transaction Set Header

**Detail Segments**

SE — Transaction Set Trailer

GE — Functional Group Trailer

GS — Functional Group Header

ST — Transaction Set Header

**Detail Segments**

SE — Transaction Set Trailer

GE — Functional Group Trailer

IEA — Interchange Control Trailer

Communications Transport Protocol

FUNCTIONAL GROUP

FUNCTIONAL GROUP

INTERCHANGE ENVELOPE

COMMUNICATIONS SESSION

See the following EDI Transmission schematic. The schematic illustrates a typical format for electronically transmitting a series of diverse business transactions.    **10.2.1 Control Segments**

# ICS Interchange Control Structures

**Functional Group ID=**

## Introduction:

The purpose of this standard is to define the control structures for the electronic interchange of one or more encoded business transactions including the EDI (Electronic Data Interchange) encoded transactions of Accredited Standards Committee X12. This standard provides the interchange envelope of a header and trailer for the electronic interchange through a data transmission, and it provides a structure to acknowledge the receipt and processing of this envelope.

## Notes:

The functional group is not an interchange component of this standard but appears here to establish positioning for the functional groups.

The following symbols are found in the convention:
         > >    indicates a required element
         X     indicates an element not used

| | Pos. No. | Seg. ID | Name | Req. Des. | Max.Use | Loop Repeat | Notes and Comments |
|---|---|---|---|---|---|---|---|
| | 010 | ISA | Interchange Control Header | M | 1 | | |
| Not Used | 020 | TA1 | Interchange Acknowledgment | O | 1 | | |
| | 030 | GS | Functional Group Header | O | 1 | | |
| | 040 | GE | Functional Group Trailer | O | 1 | | |
| | 050 | IEA | Interchange Control Trailer | M | 1 | | |

|  |  |
|---|---|
| **Segment:** | **ISA** Interchange Control Header |
| **Position:** | 010 |
| **Loop:** | |
| **Level:** | |
| **Usage:** | Mandatory |
| **Max Use:** | 1 |
| **Purpose:** | To start and identify an interchange of zero or more functional groups and interchange-related control segments |
| **Syntax Notes:** | |
| **Semantic Notes:** | |
| **Comments:** | |

**Notes:** The actual value of the data element separator, the sub-element separator, and the segment terminator for all the segments following this ISA (that starts this communication) through the IEA (that completes the transmission) are established in the ISA. Byte 4, following the three bytes that comprise the ISA (the identification of this header) is used to separate the remaining elements in this and all succeeding data elements through the end of the IEA. This implementation guide uses the asterisk (*) as the graphic representation of the data element I15. It also is the sub-element separator through the end of the IEA. This implementation guideline uses the colon (:) as the graphic representation of the sub-element separator. The value at the last position of the ISA establishes the segment terminator for the communication through the end of the IEA. The ISA consists of fixed length fields, therefore the segment terminator will be the 106th byte or the first byte after data element ISA16. This implementation guideline uses N/L as the graphic representation of the segment terminator.

The control characters selected as the segment separator, sub-element separators and the segment terminators must be characters that will not be data characters within the communication. Accepatble characters, in hexadecimal notation are HEX 04, HEX 0D, HEX 4F, HEX 1C, or HEX 15.

Example:
ISA*00*xxxxxxxxxx*00*xxxxxxxxxx*01*123456789xxxxxx*90*057949910002Pxx*950704*2300*U*00304*000000789*0*P*:N/L

### Data Element Summary

| | Ref. Des. | Data Element | Name | Attributes | | |
|---|---|---|---|---|---|---|
| > > | **ISA01** | **I01** | **Authorization Information Qualifier** | M | ID | 2/2 |
| | | | Code to identify the type of information in the Authorization Information. | | | |
| | | | 00          No Authorization Information Present (No Meaningful Information in I02) | | | |
| > > | **ISA02** | **I02** | **Authorization Information** | M | AN | 10/10 |
| | | | Information used for additional identification or authorization of the interchange sender or the data in the interchange; the type of information is set by the Authorization Information Qualifier (I01) | | | |
| | | | This element is fixed field length. It must be space filled. | | | |
| > > | **ISA03** | **I03** | **Security Information Qualifier** | M | ID | 2/2 |
| | | | Code to identify the type of information in the Security Information. | | | |

|  |  |  |  |  |  |  |
|---|---|---|---|---|---|---|
|  |  | 00 | No Security Information Present (No Meaningful Information in I04) |  |  |  |

| >> | **ISA04** | **I04** | **Security Information** | **M** | **AN** | **10/10** |
|---|---|---|---|---|---|---|

This is used for identifying the security information about the interchange sender or the data in the interchange; the type of information is set by the Security Information Qualifier (I03)

This element is fixed length. It must be space filled.

| >> | **ISA05** | **I05** | **Interchange ID Qualifier** | **M** | **ID** | **2/2** |
|---|---|---|---|---|---|---|

Qualifier to designate the system/method of code structure used to designate the sender or receiver ID element being qualified.

|  |  | 01 | Duns (Dun & Bradstreet) |
|---|---|---|---|
|  |  | 09 | X.121 (CCITT) |
|  |  | 16 | Duns Number With 4-Character Suffix |

| >> | **ISA06** | **I06** | **Interchange Sender ID** | **M** | **AN** | **15/15** |
|---|---|---|---|---|---|---|

Identification code published by the sender for other parties to use as the receiver ID to route data to them; the sender always codes this value in the sender ID element

| >> | **ISA07** | **I05** | **Interchange ID Qualifier** | **M** | **ID** | **2/2** |
|---|---|---|---|---|---|---|

Qualifier to designate the system/method of code structure used to designate the sender or receiver ID element being qualified.

|  |  | 01 | Duns (Dun & Bradstreet) |
|---|---|---|---|
|  |  | 09 | X.121 (CCITT) |
|  |  | 16 | Duns Number With 4-Character Suffix |

| >> | **ISA08** | **I07** | **Interchange Receiver ID** | **M** | **AN** | **15/15** |
|---|---|---|---|---|---|---|

Identification code published by the receiver of the data. When sending, it is used by the sender as their sending ID, thus other parties sending to them will use this as a receiving ID to route data to them.

For the DMR, this is the EPA Duns number for a particular application.

057944910002P  U.S. Environmental Protection Agency - Research Triangle Park, NC

| >> | **ISA09** | **I08** | **Interchange Date** | **M** | **DT** | **6/6** |
|---|---|---|---|---|---|---|

Date of the interchange.

| >> | **ISA10** | **I09** | **Interchange Time** | **M** | **TM** | **4/4** |
|---|---|---|---|---|---|---|

Time of the interchange.

| >> | **ISA11** | **I10** | **Interchange Control Standards Identifier** | **M** | **ID** | **1/1** |
|---|---|---|---|---|---|---|

Code to identify the agency responsible for the control standard used by the message that is enclosed by the interchange header and trailer.

|  |  | U | U.S. EDI Community of ASC X12, TDCC, and UCS |
|---|---|---|---|

| >> | **ISA12** | **I11** | **Interchange Control Version Number** | **M** | **ID** | **5/5** |
|---|---|---|---|---|---|---|

This version number covers the interchange control segments.
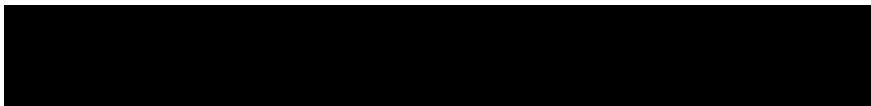
**Segment:** **GS** Functional Group Header

**Position:** 030
**Loop:**
**Level:**
**Usage:** Optional
**Max Use:** 1
**Purpose:** To indicate the beginning of a functional group and to provide control information
**Syntax Notes:**
**Semantic Notes:**
**Comments:**

**Notes:** The GS segment establishes the Version/Release for the transaction sets between it and the GE (Group End) segment.

Example: GS*123456789*873186902*940115*2300*1*X*003041 N/L

**Data Element Summary**

| Ref. Des. | Data Element | Name | | Attributes | |
|---|---|---|---|---|---|

>> **GS01** 479 **Functional Identifier Code** M ID 2/2

Code identifying a group of application related Transaction Sets.

| | | |
|---|---|---|
| FA | Functional Acknowledgment (997) | |
| NC | Nonconformance Report (842) | |
| RT | Report of Test Results (863) | |

>> **GS02** 142 **Application Sender's Code** M AN 2/15

Code identifying party sending transmission. Codes agreed to by trading partners.

>> **GS03** 124 **Application Receiver's Code** M AN 2/15

Code identifying party receiving transmission. Codes agreed to by trading partners.

>> **GS04** 373 **Date** M DT 6/6

Date (YYMMDD).

Date sender generated a fu;nctional group of transaction sets.

>> **GS05** 337 **Time** M TM 4/6

Time expressed in 24-hour clock time as follows: HHMM, or HHMMSS, or HHMMSSD, or HHMMSSDD, where H = hours (00-23), M = minutes (00-59), S = integer seconds (00-59) and DD = decimal seconds; decimal seconds are expressed as follows: D = tenths (0-9) and DD = hundredths (00-99)

Time (HHMM) when the sender generated a functional group of transaction sets (local time at sender's location).

>> **GS06** 28 **Group Control Number** M N0 1/9

Assigned number originated and maintained by the sender.

It is suggested the Group Control Number start with 000000001 and increment by 1 for each subsequent GS in the communication.

>> **GS07** 455 **Responsible Agency Code** M ID 1/2

Code used in conjunction with Data Element 480 to identify the issuer of the standard.

|  |  |  | X | Accredited Standards Committee X12 | | | |

> >   **GS08**   **480**   **Version / Release / Industry Identifier Code**   **M   AN   1/12**

Code indicating the version, release, subrelease, and industry identifier of the EDI standard being used, including the GS and GE segments. If code in DE455 in GS segment is X, then in DE 480 positions 1-3 are the version number; positions 4-6 are the release and subrelease, level of the version; and positions 7-12 are the industry or trade association identifiers (optionally assigned by user). If code in DE455 in GS segment is T. then other formats are allowed.

The release used for the DMR 863 is 003041; for the 842 is 003050; and for the 997 is 003040.

003040   Draft Standards Approved for Publication by ASC X12 Procedures Review Board

003041   Draft Standards Approved for Publication by ASC X12 Procedures Review Board

003050   Draft Standards Approved for Publication by ASC X12 Procedures Review Board

**Segment:** **GE** Functional Group Trailer
**Position:** 040
**Loop:**
**Level:**
**Usage:** Optional
**Max Use:** 1
**Purpose:** To indicate the end of a functional group and to provide control information
**Syntax Notes:**
**Semantic Notes:**
**Comments:**
**Notes:** Example: GE*9*1 N/L

### Data Element Summary

| Ref. Des. | Data Element | Name | Attributes | | |
|-----------|--------------|------|------------|---|---|
| >>  GE01 | 97 | **Number of Transaction Sets Included** | **M** | **N0** | **1/6** |
| | | Total number of transaction sets included in the functional group or interchange (transmission) group terminated by the trailer containing this data element. | | | |
| >>  GE02 | 28 | **Group Control Number** | **M** | **N0** | **1/9** |
| | | Assigned number originated and maintained by the sender. | | | |

| | | |
|---|---|---|
| **Segment:** | **IEA** Interchange Control Trailer | |
| **Position:** | 050 | |
| **Loop:** | | |
| **Level:** | | |
| **Usage:** | Mandatory | |
| **Max Use:** | 1 | |
| **Purpose:** | To define the end of an interchange of zero or more functional groups and interchange-related control segments | |
| **Syntax Notes:** | | |
| **Semantic Notes:** | | |
| **Comments:** | | |
| **Notes:** | Example:  IEA*000000789 N/L | |

**Data Element Summary**

| Ref. Des. | Data Element | Name | Attributes | | |
|---|---|---|---|---|---|
| >> **IEA01** | **I16** | **Number of Included Functional Groups** | M | N0 | 1/5 |
| | | A count of the number of functional groups included in an interchange | | | |
| >> **IEA02** | **I12** | **Interchange Control Number** | M | N0 | 9/9 |
| | | A control number assigned by the interchange sender | | | |

Together with the sender ID, it uniquely identifies the interchange data to the receiver.  It is suggested that the sender, receiver, and all third parties be able to maintain an audit trail of interchanges using this number.  This number must agree with the number in ISA12.